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ABSTRACT

This book consists of two complete units on paleontology, dinosaurs, and fossils. The first unit is created for lower elementary students and the second one is for upper elementary grade levels. The units are designed for gifted students and encourage students to be responsible for their own education. Each unit is based on an interdisciplinary approach. Suggestions for adaptation of the units are also included. (YDS)

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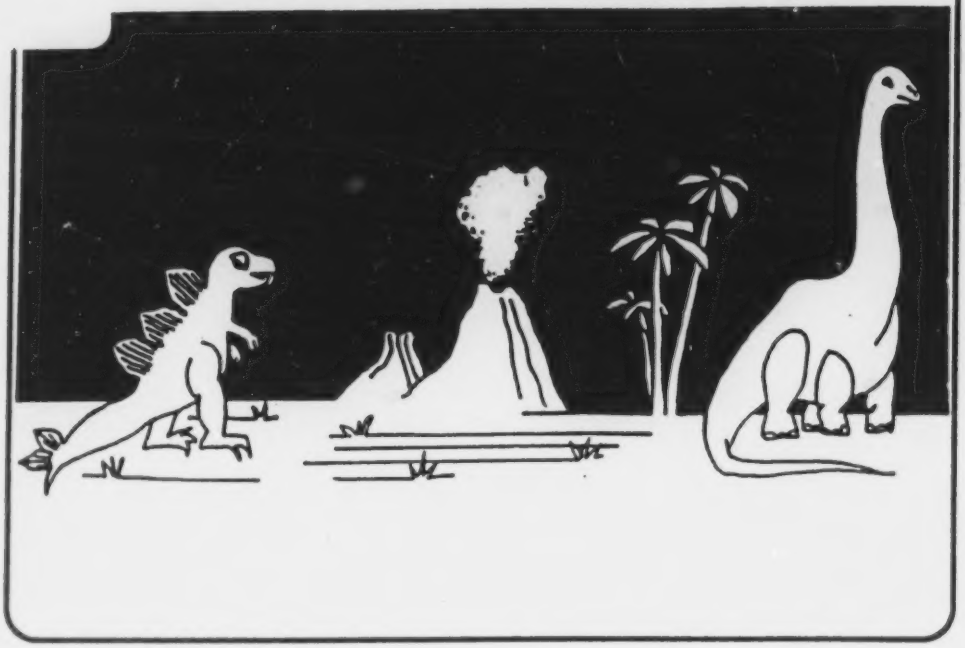
PALEONTOLOGY

Dinosaurs and Other Fossils —Digging into the Past



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A SELF-DIRECTED LEARNING EXPERIENCE

Each packet:

- is reproducible
- requires little teacher preparation
- works well with the entire class, individually, or with a small group
- includes two group levels: K-3 and 4-8, a bibliography, and learning center ideas

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PALEONTOLOGY

Dinosaurs and Other Fossils: Digging into the Past

by Joey Tanner

Self-directed study units
for grades K–3 and 4–8.

Process- and product-oriented
interdisciplinary learning through:

Evaluating

Imagining

Researching

Reporting

Thinking and reacting

Mapping and charting

Creating and appreciating

Classifying and comparing

Career exploration and goal clarification

ZEPHYR PRESS
Tucson, Arizona

PALEONTOLOGY
Dinosaurs and Other Fossils: Digging into the Past

Grades K-8

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The Premise

Learning Is Natural

Children are active participants in their learning, not passive vessels to be filled.

They are always seeking and choosing what they will learn and what they will not learn.

Their interest, trust, and active involvement are crucial.

Children tend to become personally involved in projects that appeal to a variety of modalities . . . reading, writing, reasoning, building, imagining, and creating.

What a gift we give when we respect the child's natural need to explore, to reflect, to communicate, to dream, to celebrate!

(Available in poster form from Zephyr Press)

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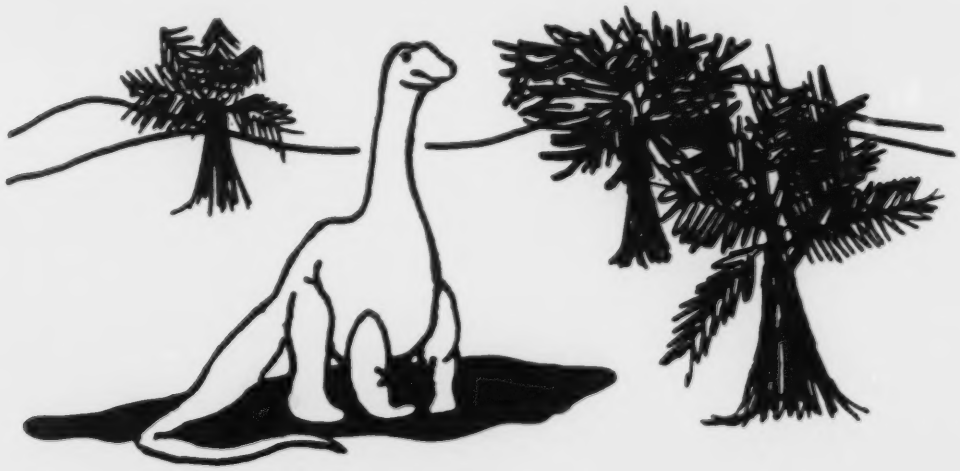
A Word to the Teacher

PALEONTOLOGY

PALEONTOLOGY (from the Greek word *palaios,* meaning ancient) is "a science dealing with the life of past geological periods as known from fossil remains" *(Webster's Ninth).* The study of plants and animals whose remains have been preserved in rocks reveals much about our Earth's past.

Paleontology is much more than learning about dinosaurs or discovering fossils; it is the story of the beginnings of natural history. From creatures too simple to be classified as plants to the warm-blooded mammals that outlived the dinosaur, the remains of the past tell the story of humanity and other animal life.

The paleontologist looks for missing pieces in the complex puzzle that describes our origins and enhances our understanding of life today. Pierre Teilhard de Chardin, the often-quoted paleontologist of the early twentieth century, speaks of the idea of "something greater and more indispensable than ourselves: something that existed before we did and could have continued to exist without us" in his book *Building the Earth.* The study of paleontology, then, may provide more than an "interesting" prehistoric view of the process of life on this planet. Within the ancient digs of our Earth may remain a hint of the meaning of the universe.



Rationale for Self-directed Learning

Our children's education must be more than the memorization of capitals of the states, products of countries, and dates and places of past wars. Most teachers and parents would agree that what is also wanted is for our children to learn to think for themselves, to make wise choices, to work independently, to thoughtfully evaluate the results of their study, and to use their knowledge and skills creatively.

Obstacles to Independent Learning

In spite of the teacher's best efforts, many, if not most, classroom programs involve students in schedules and organizational plans that foster dependence rather than the independence we prefer. Students are told what is to be learned and how long it will take them to learn it. The teacher not only defines the resources but also decides whether the learning experience was a satisfactory and valuable one.

A Learning Atmosphere

Each time we, as educators, focus on what our objectives are, we need to take a fresh look at our classroom mode of operation and evaluate the effectiveness of the way we teach. Quite naturally, for most of us, our teaching style has had more to do with how we were taught than with what recent research has shown about the learning process. Even our good instincts have been overcome by the years of conditioning we have known in our own educational processes.

Like a breath of fresh air, recent findings from research on the brain support our intuitive knowledge. This research shows that our brains are receptive to learning only under certain conditions. Our job is to translate that information into a classroom atmosphere that provides

- challenge
- freedom within structure
- trust and warmth
- recognition of each student's learning process
- opportunities to experience success
- personal involvement in the curriculum

A natural transition generally occurs that transforms the former "teacher-lecturer" into a "fellow learner." As fellow learner, the teacher becomes a resource person, a facilitator, and a classroom manager. In this maturing atmosphere, students gradually come to see themselves as responsible for their own learning, and a foundation for self-direction is set.

At this point, an unexpected problem sometimes arises. We find students no more ready for their independent learning than we, as teachers, were ready to allow it. This common occurrence is mentioned repeatedly in the literature dealing with programming for the gifted, an area in which independent study and research are recommended as major curricular activities. See Suggested Readings.

From Passive Learner to Active Participant

(Bridging the Gap)

The Zephyr self-directed study unit was developed expressly to bridge that gap: to transport the student from the position of passive recipient to that of an active participant in his/her own pursuit of knowledge.

Within the defined structure of each unit, students are given opportunities to

- make choices
- learn at their own paces
- learn in a manner suited to their own learning styles
- expand their research skills
- use a variety of modalities
- plan their own time
- develop the skills of creative, critical, and evaluative thinking
- experience whole-brain learning

Because assuming responsibility for directing their own learning is often an unfamiliar situation for students, they will need your encouragement at the start. Generally within six to nine weeks most students will be well on their way from teacher-dependence to self-motivation. (Beginning the venture with only a few choices, then gradually arranging the setting so that there are more and more choices works best.) As students assume more responsibility, many teachers begin to consider the school library as just another part of the classroom. The benefits are many, from gaining a personal relationship with the librarian to learning about the enormous resources available in most school libraries.

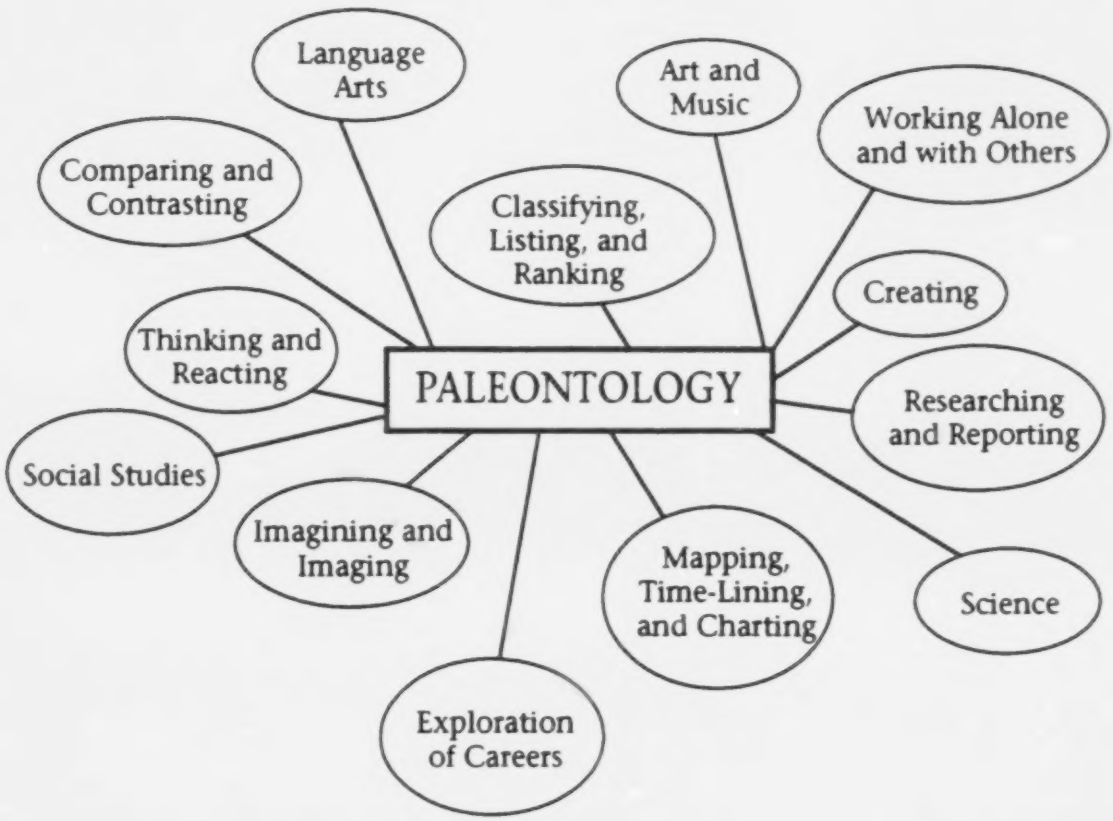
Eventually, a few students will be ready for a true investigative research study of professional quality as suggested by Joseph Renzulli in *Enrichment Triad Model: A Guide for Developing Defensible Programs for the Gifted and Talented*, 1977.

The Format

These units were originally developed for gifted students, but we now recognize that every child is gifted in one or more of the multiple intelligences. The units emphasize the use of higher-level thinking skills and are appropriate for use in any classroom where the goal is to encourage students to become responsible for their own education.

Interdisciplinary in content, each unit envelops a broad view of the topic by integrating the "basics" into each activity.

Within this book are two complete units: one created for the lower elementary student and one for the upper elementary student. Suggestions for adapting or adjusting either of the levels to fit any individual classroom are included.



Suggested Readings

Self-directed Study

Armstrong, Thomas. *In Their Own Way: Discovering and Encouraging Your Child's Personal Learning Style.* Los Angeles: J. P. Tarcher, 1988.

Brewer, Chris, and Don G. Campbell. *Rhythms of Learning: Creative Tools for Developing Lifelong Skills.* Tucson, Ariz.: Zephyr Press, 1991.

Clark, Barbara. *Optimizing Learning.* Columbus, Ohio: Merrill Publishing Company, 1986.

Gallagher, James. *Teaching the Gifted Child.* 3d ed. Boston: Allyn & Bacon, 1985.

Gardner, Howard. *Frames of Mind: The Theory of Multiple Intelligences.* New York: Basic Books, 1985.

Kline, Peter. *The Everyday Genius: Restoring Children's Natural Joy of Learning.* Arlington, Va.: Great Ocean, 1988.

Maker, C. J. *Curriculum Development for the Gifted.* Rockville, Md.: Aspen Systems Corporation, 1982.

Malehorn, Hal. *Open to Change: Options for Teaching Self-directed Learners.* Palo Alto, Calif.: Scott Foresman and Company, 1978.

Miller, Ron. *What Are Schools For? Holistic Education in American Culture.* Brandon, Vt.: Holistic Education Press, 1990.

Purkey, William, and John Novak. *Inviting School Success: A Self-Concept Approach to Teaching and Learning.* 2d ed. Belmont, Calif.: Wadsworth Publishing Company, 1984.

Renzulli, Joseph. *Enrichment Triad Model: A Guide for Developing Defensible Programs for the Gifted and Talented.* Mansfield, Conn.: Creative Learning Press, 1977.

Stoddard, Lynn. *Redesigning Education: A Guide for Developing Human Greatness.* Tucson, Ariz.: Zephyr Press, 1991.

Udall, Anne J., and Joan E. Daniels. *Creating the Thoughtful Classroom: Strategies to Promote Student Thinking.* Tucson, Ariz.: Zephyr Press, 1991.

Getting Started

1. Select a topic as an extension of a regular subject (particularly when your class seems to crave more), or select a topic to pursue that is of particular interest and may not be a part of the curriculum. To zero in on special interests, administer an interest survey to each student.

2. Copy the unit for each student. When using these units for the entire class, you may want to expand or delete activities for individual students.

3. Set up a center in the classroom that encourages exploration in the subject field. You'll want to include a variety of materials. Be creative—the purpose of the center is to excite the students, so begin with lots of hands-on materials. Allow for ample browsing time and encourage students to investigate and become absorbed.

4. Go over each activity in the unit with the students, discussing and answering any questions. You, as teacher, are the key to successful implementation. Because most children are already well versed in the "One Right Answer" game, they will need encouragement to branch out into many of the open-ended activities in the packets.

5. Set the stage. Plan conferences and provide resources as needed. Then, get out of the way and let your students learn.

6. Give as much time as each student needs to complete each activity in the unit. The entire packet might take from five to ten weeks or longer.

7. As each activity is completed and evaluated, initial the activity near each number. You will want to evaluate on the basis of the response that is appropriate for each individual student.

8. When a student shows extreme interest in the topic, the completion of this unit might be only the beginning. This student may be ready for further study and research and may need only resources, guidance, and freedom to pursue his/her well-planned project.

Interest Development Center

PALEONTOLOGY

The purpose of this interest center is to stimulate interest in the topic area. Students need time for browsing and investigating for maximum benefit. To expedite the exploration process, you might make the following materials available. These are beginning ideas; you and your students will think of more. Let parents and other teachers know about the center, and it will grow without effort.

BOOKS, POSTERS, VIDEOS, FILMS, FILMSTRIPS, AND SLIDES

Fossils
Geology and geologic eras
Dinosaurs
Glaciers
Volcanoes
Paleontologists
Early fishes, reptiles, and plants
Archaeologists
Prehistory
Creation myths and legends
Rock strata
Early tools
Early humans
Extinction
Current endangered species

OBJECTS AND ARTIFACTS

Pamphlets from natural history museums
Models, stuffed animals, or toy dinosaurs
Real fossils or replicas of fossils
A time line of the history of the world
Songs and recordings about dinosaurs
National Geographic magazines and related journals

ART SUPPLIES

Watercolors, chalk, oil pastels, polyform clay, markers, and various weights and textures of paper

To Prepare for Further Research

Students will need to decide:

- What will the study be? What will be investigated and produced?
- Where will the background information be found (e.g., speaker, interviews, books, film, microfiche, documents)?
- What, exactly, will be the form of the product: a model, a manuscript, or . . . ?
- Who might be interested in the product: professionals in the field, publishers, organizations, or . . . ?
- What is needed to begin: specific plans, resources, deadlines, or . . . ?

Suggestions for Adapting the Unit to Your Particular Learning Situation

- Require fewer, or more, research sources.
- Assign more of the activities to small groups instead of to individual students.
- Give fewer or more choices.
- Delete some activities altogether.
- Arrange the unit as a class project with students choosing different parts to complete.
- Add some activities of your own.

PALEONTOLOGY

Dinosaurs and Other Fossils: Digging into the Past

Name _____

Date _____

UNIT I

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1. Setting the Stage

Millions of years ago the plants and animals that lived on Earth were different from the ones we see now. We can learn about these ancient forms of life by studying fossils. The study of fossils is called *paleontology.*

Have you ever seen a fossil?

- Draw a picture of a fossil you have seen.

  OR

- Draw a picture showing what you think an ancient plant or animal might have looked like.

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2. Research

For the record:

Largest dinosaur _____

Smallest dinosaur _____

Most unusual dinosaur _____

Add some other facts _____

_____

_____

_____

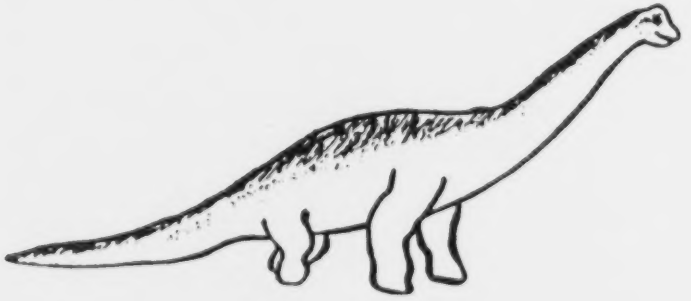
PALEONTOLOGY © 1993 Zephyr Press, Tucson, AZ

3. Investigate

Find out the names of five to ten different dinosaurs or other early creatures. Then find out when they were living.

- Make a card for each one. Draw a picture and write the name on the front and put when they lived on the back.

Tell your class or some friends about the cards. See who can put the cards in order from earliest to most recent . . . without looking. (You try it first!)



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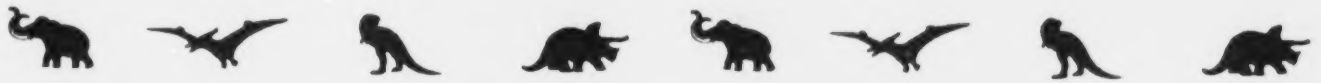

4. Compare and Contrast

Choose two dinosaurs.

Fiill in the blanks below. Then ✔ if those characteristics are alike or different.

			Alike	Different
Dinosaur Name	_____	_____		
Size	_____	_____		
Diet	_____	_____		
	_____	_____		
Habitat	_____	_____		
	_____	_____		

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5. Study—Think

Find out why dinosaurs are extinct.

- Make a chart or bulletin board display to show what might have happened.

OR

Find out about mammals and birds during the time of the dinosaur.

- Show what you learned in a mobile or mural.

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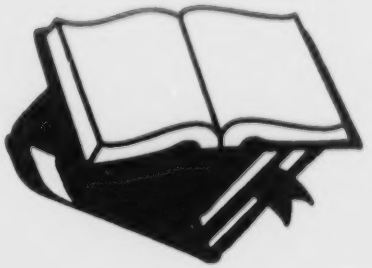
6. The Paleontologist

Find out about a paleontologist.

Where did he or she live?

What did he or she find?

- Make a book showing the story.



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7. Just Imagine

Imagine that you are transported in a time machine to the time of the dinosaurs. You see your first animals.

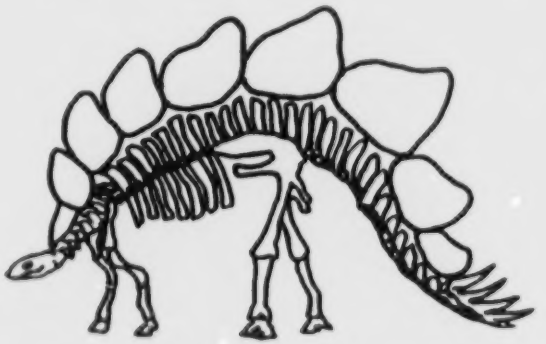
What do you feel?

What do you hear?

What do you smell?

What do you see?

What do you say?



- Write a story about your trip or make a cassette recording of your experiences.

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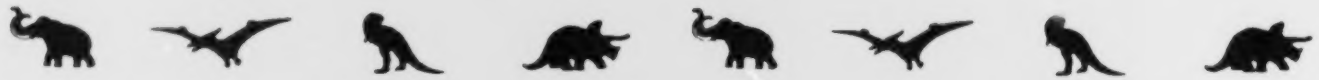


8. With Some Friends or By Yourself

- Draw or paint a mural of the land of dinosaurs. Label the dinosaurs with their scientific names.

  OR

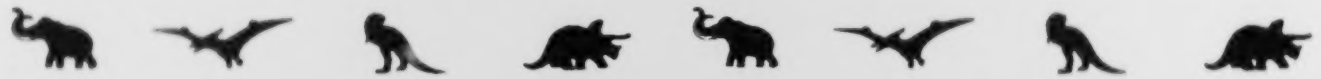
- Using thick mud or plaster of paris, make your own fossils.

  Put wet mud or plaster of paris into a paper plate.

  Press in an object like a bean or shells or something else. Let it almost dry, then take out the object.

  Set up a museum.

  Label the "fossils."



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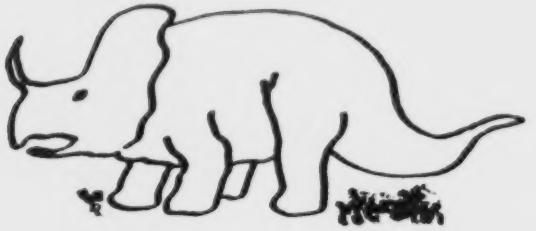
9. Vocabulary



What do you mean?

DINOSAUR _____

FOSSIL _____

PALEONTOLOGIST _____

HABITAT _____

MUSEUM _____

PERIOD _____

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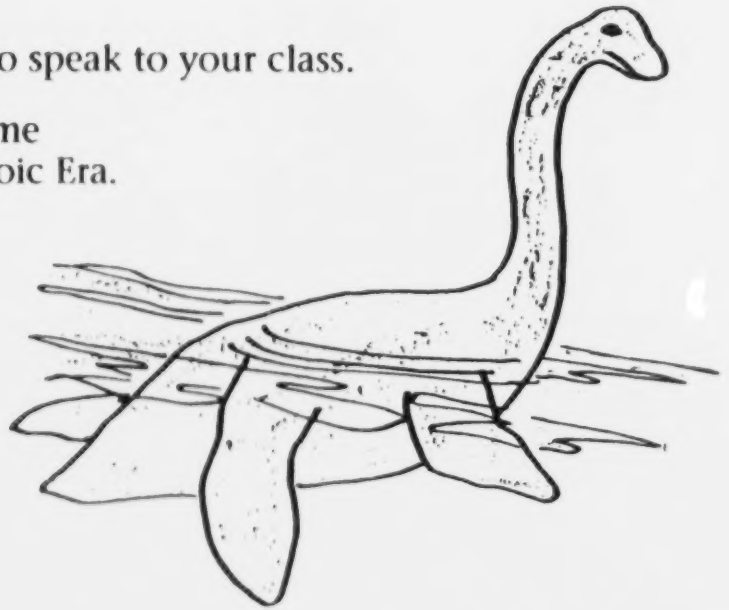
10. Learn Some More

CHOOSE ONE:

Invite a paleontologist to speak to your class.

Visit a museum to become familiar with the Mesozoic Era.



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11. Word Games

- Create a seek-and-find or crossword puzzle using the names of dinosaurs, ancient birds, and other prehistoric animals.

  Make copies for your friends.

  OR

- List the names of 10 or more dinosaurs with a brief description of each one.

  Make a game, using the names and descriptions.

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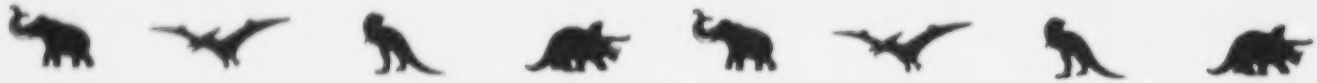

12. Extinct Is Forever

What does "extinct" mean? What does "endangered species" mean?

- List the names of 5 extinct animals. Then list 5 endangered species. Then tell 3 ways you think people could help save some endangered species.

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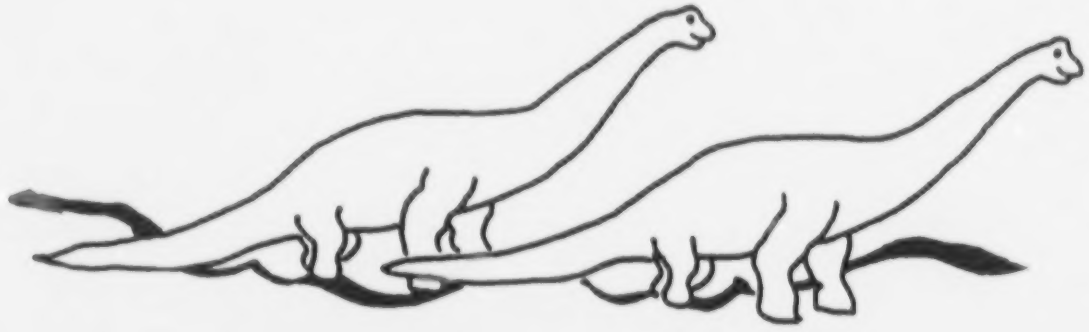
13. Beginnings and Endings

Watch the *Rite of Spring* segment of Disney's *Fantasia.*

How do you think the dinosaurs felt?

Talk about your reactions to the movie.



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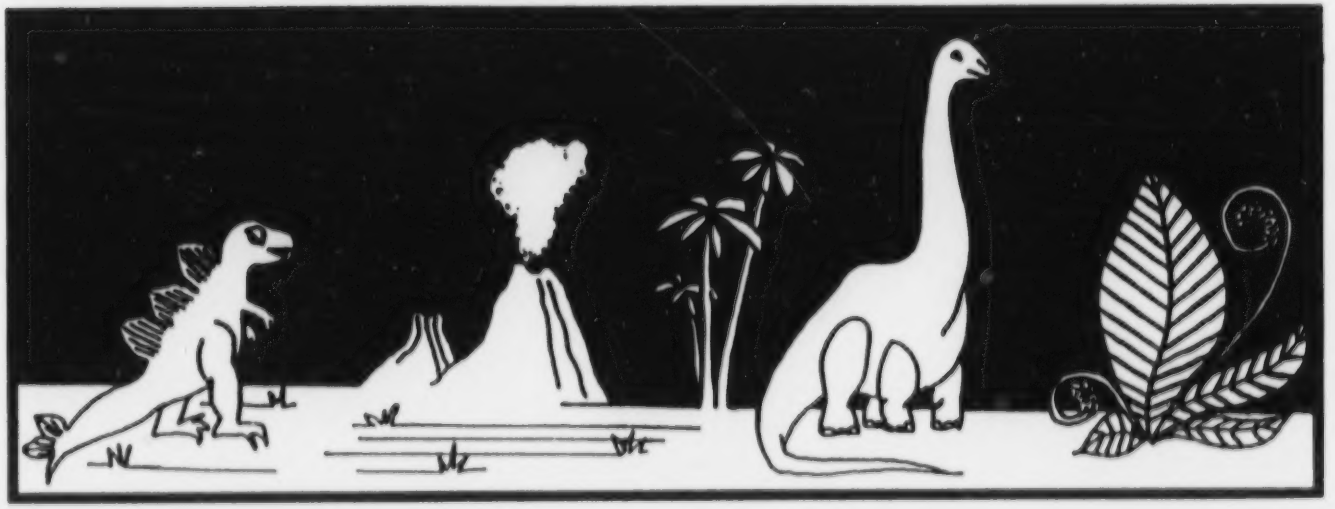
PALEONTOLOGY

Dinosaurs and Other Fossils: Digging into the Past



Name _____

Date _____

UNIT II

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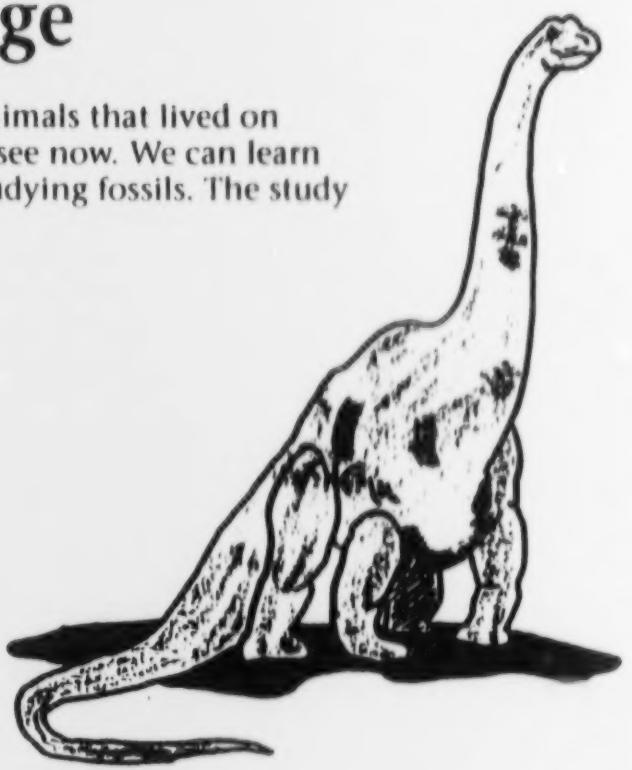
1. Setting the Stage

Millions of years ago the plants and animals that lived on Earth were different from the ones we see now. We can learn about these ancient forms of life by studying fossils. The study of fossils is called *paleontology*.

What are fossils?

- Draw pictures of at least two different kinds of fossils.



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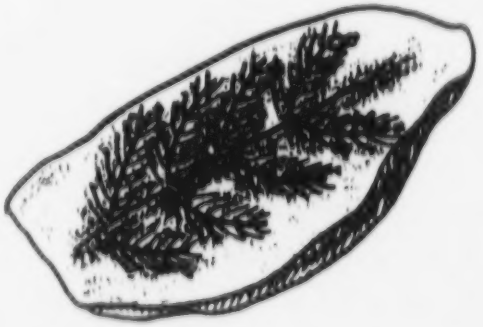
2. Fossil Facts

It can take millions of years for a plant or animal to become a fossil.

Find out how fossils are formed.

- Choose a plant or an animal. In a chart or mural, show how it becomes a fossil.



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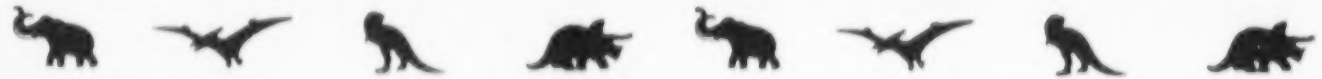

3. Dead or Alive?

Some types of animals from earlier periods can also be found on Earth today.

- List 5 or 6 that are alive today and 5 or 6 that are not.

  Why did some become extinct while others survived?

- Report your reasons in an essay, a story, or a "news broadcast."

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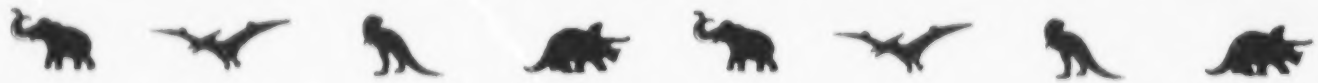

4. Research

For the record:

Largest dinosaur _____

Smallest dinosaur _____

Fiercest dinosaur _____

Brain size of a dinosaur _____

Shortest lived _____

Longest lived _____

Most unusual _____

Most recent _____

First dinosaur fossil found _____

ADD SOME OF YOUR OWN

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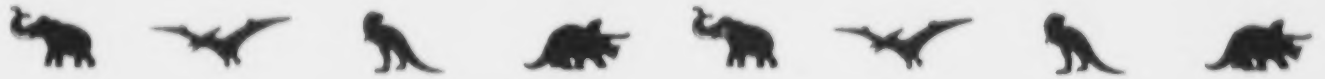

5. Investigate and Create

CHOOSE ONE:

- Using a long strip of paper, such as wide adding-machine tape, make a time line for the last 5 billion years. Show the different time periods and the types of life (plant and animal) in each.
- Where would you search for dinosaur remains? Why? Make a map showing the major finds so far.
- Create a mobile or chart of the animal life during the Paleozoic Era. Label the animals and the time periods.
- Investigate the rise and decline of the dinosaur. Why? How? When? Include recent findings. Write and illustrate a report or create a cassette recording of your findings.

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6. Contrast and Compare

Research diplodocus or Tyrannosaurus rex and a Gila monster or a Komodo dragon. What qualities do they have in common? What differences are there?

- Make a chart or booklet comparing them—size, life span, habitat, period, intelligence, diet, etc.

  OR

- Design a mural showing the differences in animal life from the Cambrian to the Carboniferous periods. Label each animal.

  OR

- Arrange and present a debate. The subject is: "Dinosaurs: Warm- or Cold-Blooded Animals?"

  OR

- Create a diagram or write an article describing the differences in the mammals of the Cretaceous Period.

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7. Fossil Folklore

Fossils have been a part of folklore for thousands of years. For example, the fossil teeth of a Mesozoic fish were believed to come from the heads of toads and were thought to cure epilepsy.

What are some other examples?

- Make a book of fossil folklore with drawings and stories. Include at least 5 examples.

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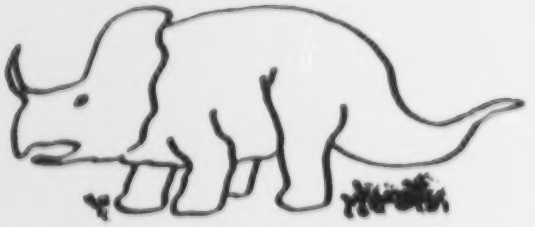
8. What's in a Name?

Dinosaurs' names have meanings!

Find the meaning of at least five dinosaur names.



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9. Paleontology Begins

It was only about 300 years ago that the serious study of fossils began.

- Make a time line showing at least 10 important discoveries in the field of paleontology.

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10. The Paleontologist

Research the life and work of two paleontologists.

Use people from the following list or any others you find.

Louis Agassiz
Dr. Roy Chapman Andrews
Mary Anning
Robert Bakker
Dr. Barnum Brown
Georges Cuvier
Dr. Walter Granger
Jim Henson
Jack Horner
Professor O. C. Marsh
Dr. John Ostrom
Sir Richard Owen
William Smith
Neils Stenson
Dr. Theodoro White

Discover what these people have contributed to the field of paleontology. Would you like to have worked with them? Why or why not? Compare their childhoods, education, and career experiences.

(continued)

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10. The Paleontologist *(continued)*

Present your ideas by:

- Writing a news article

  OR

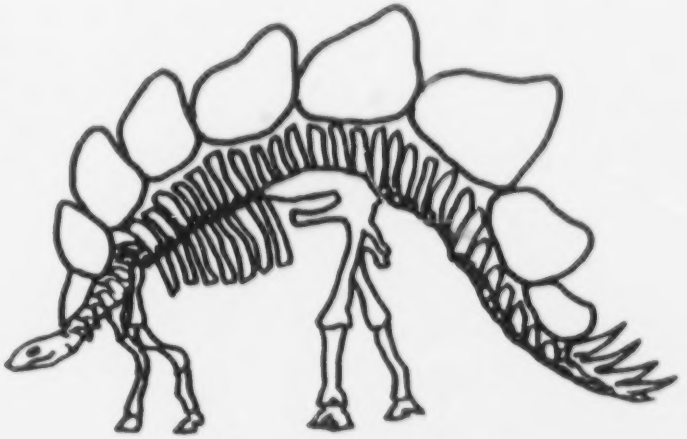
- Making a speech

  OR

- Creating a mural

  OR

- (Your own idea)



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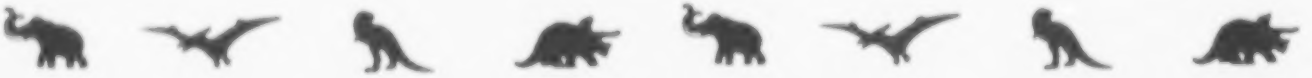
11. Careers

CHOOSE ONE:

- Imagine that you are a paleontologist and have made your very first paleontological discovery. Prepare a scientific symposium about your discovery.
- Imagine that you are presenting career possibilities to a group of high school seniors. In an essay or a chart, contrast and compare the education required and general job descriptions of the paleontologist, the geologist, and the archaeologist.
- Imagine that you are a newspaper reporter transported back to the Mesozoic Era. You are the first human to see the animals of the time. Write a front-page article for the newspaper back home about your unusual findings.



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12. Fossil Fuels

We get energy from plants and animals when we use oil and coal. These are called *fossil fuels* because they are formed from ancient organisms.

- In a mural or series of diagrams, show how coal is formed.

  OR

- List the advantages and disadvantages of using fossil fuels. Then list 3 or 4 alternatives.

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13. Arts, Crafts, and Building

CHOOSE ONE:

- Make a diorama of one or more life forms from the Paleozoic Era in their natural habitat.
- Make your own present-day fossil, using thick mud or plaster of paris in a shallow container. While it is still wet and soft, push one or more objects into it—rocks, seashells, leaves, combs, buttons, etc. Let it almost dry, then remove the object. Set up a museum of modern-day "fossils."
- Make a model of a dinosaur.

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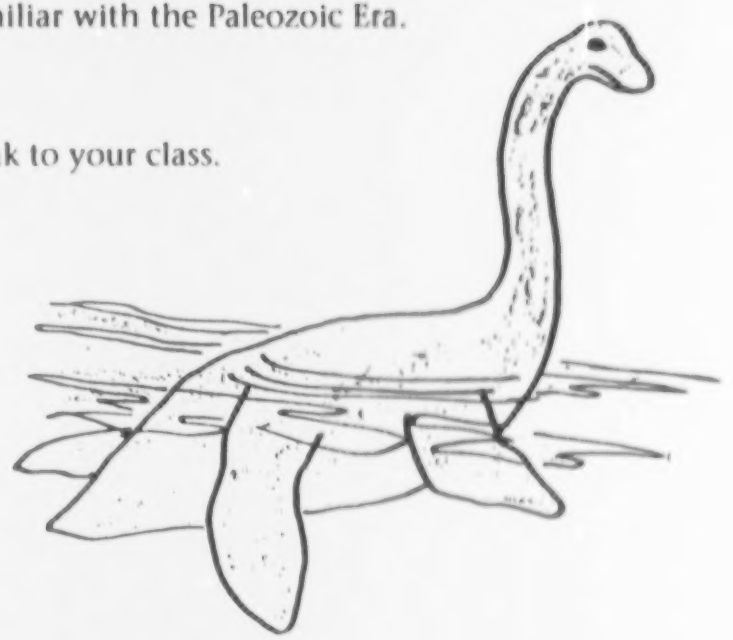
14. Dig Deeper

Visit a museum to become familiar with the Paleozoic Era.

OR

Invite a paleontologist to speak to your class.



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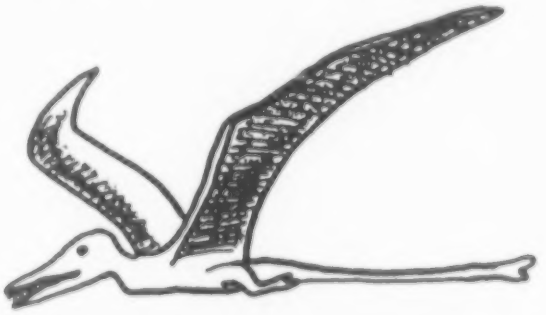
15. Group Projects

CHOOSE ONE:

- Make a chart of the birds of the Mesozoic Era.
- With some friends or the whole class create a dinosaur land on a mural or with clay. Label each dinosaur with its scientific name.
- Find out if your state has a state fossil. If it does, find out more about it. If not, decide which fossil would best represent your state, explain why, and submit it to your governor for consideration.



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16. Life on Other Continents

Some of the animals in Australia are very different from animals in most other parts of the world. Why is this?

- Draw several maps showing how the continents formed.
- In pictures or on a chart, compare 5 Australian animals with 5 animals found in North America.

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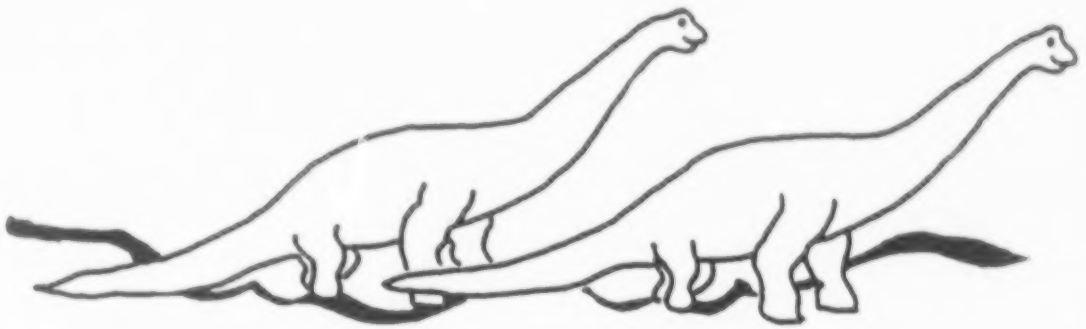
17. Word Games

- Create a seek-and-find or crossword puzzle using names of the first reptiles. Make copies for your friends.

  OR

- List the names of all dinosaurs with a brief description of each one. Make a game using the names and descriptions.



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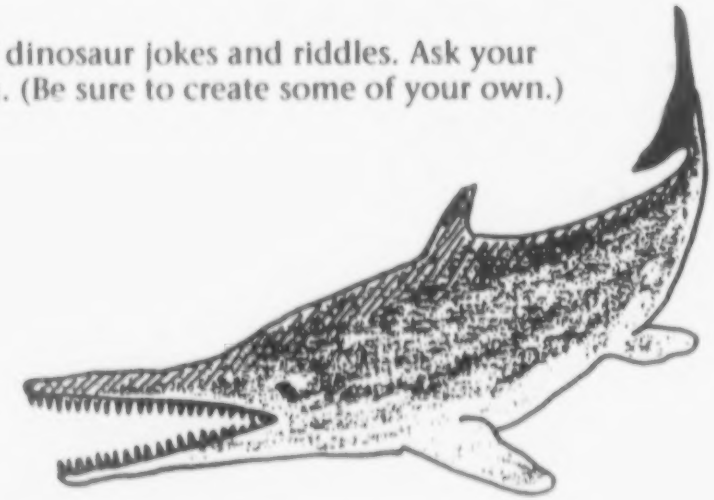
18. Just for Fun

Read a fiction book that takes place, at least in part, during the Mesozoic Era.

OR

- Put together a collection of dinosaur jokes and riddles. Ask your librarian to help you search. (Be sure to create some of your own.)



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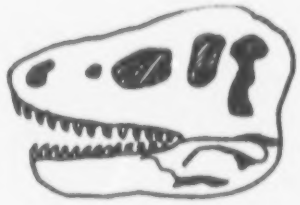
19. Tools of the Trade

What are some of the tools paleontologists use?

- Draw pictures or describe 5 or 6 tools used by paleontologists and tell how they are used.



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20. Think It Through

Consider the climate and vegetation of the habitat of any dinosaur.
Locate a comparable spot on Earth today with that same climate.
Could dinosaurs live there?

- Make a scientific prediction based on what you have learned about where and how dinosaurs lived.

  What would be different about the dinosaur's life?
  What would be the same?
  Cite your references.

  OR

Research to find at least one theory as to why dinosaurs are extinct.

- React to that theory based on what you have learned about dinosaurs.

  Do you agree or disagree? Why or why not?
  Cite your references.

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EXPLORING THE ARTS

An opportunity to integrate art experiences within an academic content area

By Stephany Mack

While each component—the self-directed learning units and Exploring the Arts—is a complete and valid learning experience in itself, together they provide a more comprehensive and lasting educational experience for the learner.

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INVENT a dinosaur of your own.
Compile important information as
if you had made the discovery yourself.

Note the:

size
color
texture
shape
habitat
diet

THEN . . .

PLAN a chart displaying this information. **PREPARE** sketches of your dinosaur showing the front, back, and side views.

DESIGN a picture of several dinosaurs. Arrange them in your composition in an interesting way. Create the illusion of depth by making the dinosaurs different sizes. Include the environment around your animals.

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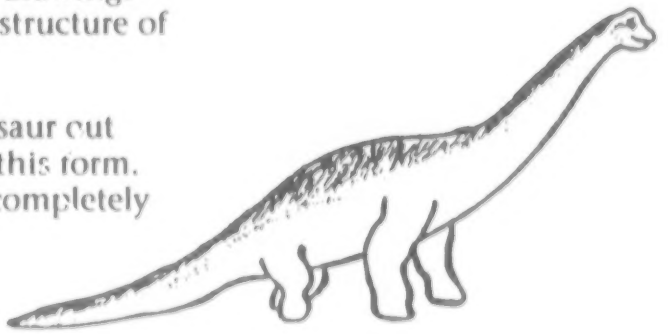
Dinosaur Sculpture

COLLECT some photographs or a model of a dinosaur.

MAKE SKETCHES of these photographs, making sure your sketches show the dinosaur from six different angles. Make the sketches as accurate as possible. Mount your drawings on a bulletin board to give a visual report of the structure of the dinosaur.

CONSTRUCT an armature (a form) of your dinosaur cut of newspaper cardboard, etc. Papier mâché over this form. Paint and decorate it when the papier mâché is completely dry.



CREATE a dinosaur totem using clay.

Create from 4 to 6 dinosaurs with moist clay. Stack or connect the in some way to make a grouping or totem. Vary the size and shape of each animal. Texture the clay in different ways for interesting surface treatments.

(Important: Check your sculpture from all sides to create more interest.)

Make your totem from polyform clay, bake at 200 degrees for 20 minutes, then paint with acrylic paint.

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Dinosaur Masks

Many cultures around the world express their beliefs and feelings about animals through the making of masks. The animal masks of the Pacific Northwest Coast tribes are good examples. Study some masks you find in library books.

Imagine how it would be to be living in the world today with dinosaurs. How would you feel about them? Might you worship dinosaurs because of their size? Would you feel fear or reverence or would you have a desire to conquer, to please, or to capture them?

DESIGN a dinosaur mask to express your feelings.

(Do some practice drawings before you actually begin to make your mask.)

Check out a mask-making book from the library. Investigate a variety of ways to make masks. Choose the way best suited to your mask design.

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Dinosaur Relief

With some friends

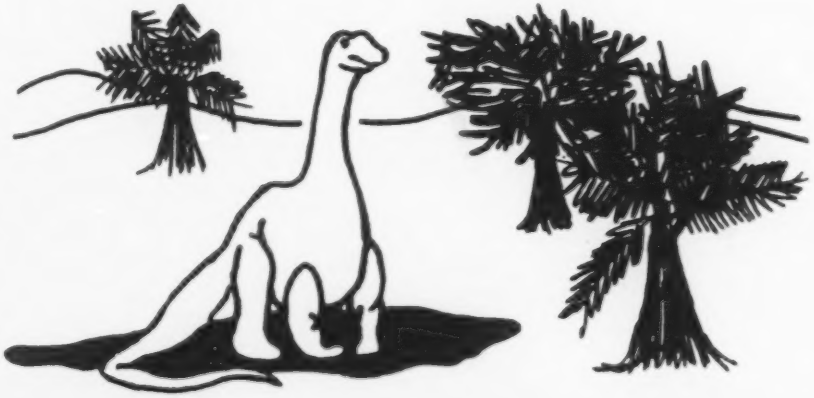
DESIGN a big dinosaur on a piece of butcher paper. Draw the side view.

Put another piece of paper under your drawing and cut out your sketch. (You will have 2 cutouts.)

PAINT and **DECORATE** your dinosaur. Staple the 2 cut-outs together all around the edges, leaving an opening big enough for your hand. Stuff torn newspaper through the opening until your dinosaur is full. Staple the opening.

When each group has completed its dinosaurs, arrange them all in an interesting composition on the floor.

Staple them to a bulletin board in the same composition. Use paper to make leaves, trees, etc. Staple the foliage around the dinosaurs to complete the stuffed dinosaur relief.



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Bibliography

Aliki. *Fossils Tell of Long Ago.* Let's-Read-and-Find-Out Science Book Series. New York: Thomas Y. Crowell, 1990. 32 pages. Grades K–4.

Explains how fossils are formed and what they tell us about the past. This book is part of an excellent series that presents basic science information in an interesting manner.

Ames, Lee J. *Draw 50 Dinosaurs and Other Prehistoric Animals.* Garden City, N.J.: Doubleday, 1977. 63 pages. Grades 2 and up.

Step-by-step drawing instructions.

Arnold, Caroline. *Dinosaur Mountain: Graveyard of the Past.* New York: Clarion Books, 1989. 48 pages. Grades 3–7.

This book describes the work of paleontologists in learning about dinosaurs by sharing the discoveries made at Dinosaur National Monument in Utah. Excellent photographs. See also, *Trapped in Tar: Fossils from the Ice Age* by Caroline Arnold (grades 4–7), a Junior Literary Guild selection as an outstanding book for boys and girls.

Barton, Byron. *Dinosaurs, Dinosaurs.* New York: Thomas Y. Crowell, 1989.

A good introduction for young children.

Bell, Robert. *Amazing Dinosaur Facts.* New York: Golden Books, Western Publishing Company, Inc., 1990. Grades K–3.

This book provides information that fits current theories. Highly readable.

Benton, Michael. *Prehistoric World.* The Simon and Schuster Illustrated Encyclopedia. New York: Simon & Schuster.

Booth, Jerry. *The Big Beast Book: Dinosaurs and How They Got That Way.* A Brown Paper School Book. Boston: Little, Brown and Company, 1988. 128 pages. Grades 3-7.

Claridge, M. *How to Draw Dinosaurs.* Young Artist Series. London: Usborne Publishing, Ltd., 1991. 32 pages. Grades 4 and up.

Craig, Annabel. *The Usborne Book of Prehistoric Facts.* Facts: Lists Series. London: Usborne Publishing Ltd., 1986. 48 pages. Grades 3 and up.

Provides hundreds of fascinating records, lists, facts, and comparisons of Earth history, dinosaurs, fossils, birds, mammals, ice ages, and human ancestors.

Cvancara, Alan. *Sleuthing Fossils.* New York: John Wiley & Sons, 1990.

Older students will learn research techniques, the value of fossils, controversies in the field, and how to identify fossils.

Dixon, Dougal. *The Last Dinosaurs.* The New Dinosaur Library. New York: Dell, 1987. 32 pages. Grades 2–3.

Concise descriptions of the characteristics and habits of thirteen dinosaurs and other prehistoric reptiles that roamed Earth during the Cretaceous Period.

———. *The Macmillan Illustrated Encyclopedia of Dinosaurs and Prehistoric Animals: A Visual Who's Who of Prehistoric Life.* New York: Macmillan, 1988.

An illustrated history of the development of dinosaurs and other prehistoric animals over the last 500 million years. An excellent resource.

———. *The New Dinosaurs: An Alternative Evolution.* Topsfield, Mass.: Salem House, 1988. 120 pages.

A highly creative look at evolution. Dixon creates realistic imaginary "dinosaur" creatures he believes might have evolved if dinosaurs had not become extinct. Excellent illustrations of "new dinosaurs" with good background on extinction theories, paleogeography, zoogeography, and habitats.

Eldredge, Niles, Gregory Eldredge, and Douglas Eldredge. *The Fossil Factory: A Kid's Guide to Digging Up Dinosaurs, Exploring Evolution, and Finding Fossils.* Reading, Mass.: Addison-Wesley, 1989.

Farlow, James O. *On the Tracks of Dinosaurs: A Study of Dinosaur Footprints.* New York: F. Watts, 1991. 72 pages.

Describes the formation and discovery of fossilized dinosaur footprints and how paleontologists use them to learn about the nature and behavior of dinosaurs.

Gibbons, Gail. *Dinosaurs.* New York: Holiday House, 1987. 32 pages. Grades PS–3.

Colorful illustrations and simple text for introductory information about dinosaurs, fossils, paleontologists, and fourteen specific dinosaurs.

Greenberg, Judith E. *Dinosaurs.* Raintree Science Adventures Series. Raintree Publishers, 1990. 32 pages. Grades 2–4.

Horner, John, and James Gorman. *Maia: A Dinosaur Grows.* Philadelphia: Running Press, 1989. Includes cassette (Mastedon Productions). 46 pages. Grades 1–adult.

A fictional story based on scientific information.

Johnson, Rolf E. *Dinosaur Hunt!* True Adventure Series. Gareth Stevens Children's Books, 1992. 32 pages. Grades 2–4.

Takes the young reader to a dinosaur dig in Montana to experience the discovery of a Torosaurus.

Lambert, David, and the Diagram Group. *The Field Guide to Prehistoric Life.* New York: Facts on File, 1985.

Technical information presented in an easy-to-follow manner for amateurs. Traces the development of organic life and discusses fossil hunting.

Lasky, Kathryn. *Dinosaur Dig.* New York: Morrow Junior Books, 1990. 62 pages. Grades 3 and up.

Lauber, Patricia. *Living with Dinosaurs*. New York: Bradbury Press, 1991. 48 pages. Grades 1–5.

This book re-creates the sounds, sights, and life among the dinosaurs living in North America (prehistoric Montana) 75 million years ago. Wonderfully realistic illlustrations of prehistoric land and creatures.

———. *The News about Dinosaurs*. New York: Bradbury Press, 1989. 48 pages. Grades 1–5.

This award-winning book describes new discoveries about current knowledge of thirteen dinosaurs. It uses recent scientific paintings and drawings to re-create realistic images of dinosaurs. See also Patricia Lauber, *Dinosaurs Walked Here and Other Stories Fossils Tell*, 1987. Grades 2–4.

McMullan, Kate. *Dinosaur Hunters*. A Step into Reading Book. New York: Random House, 1989. 48 pages. This series has four levels covering grades 1–4.

Describes the work that scientists do to find out about prehistoric animals. Other valuable books in the series: *Dinosaur Days* (K–3) and *Cave Boy* (PS–1). Random House Step-Up Books Series includes *Prehistoric Monsters Did the Strangest Things*. Grades 2–4.

Most, Bernard. *A Dinosaur Named After Me*. Orlando, Fla.: Harcourt Brace Jovanovich, 1991. 32 pages. Grades PS–3.

An enjoyable book that will help children remember dinosaur names and provide endless hours of creating new dinosaur names. Other award-winning Bernard Most books about dinosaurs: *The Littlest Dinosaurs* (PS–3), *Dinosaur Cousins* (K–3), *Whatever Happened to the Dinosaurs?* (PS–1), and *If the Dinosaurs Came Back* (PS–2).

Royston, Angela. *Dinosaurs*. Eye-Openers Series. New York: Macmillan, 1991. 24 pages. Grades PS–K.

Provides excellent illustrations, information, and descriptions about eight dinosaurs.

Schlein, Miriam. *Discovering Dinosaur Babies*. New York: Macmillan, 1991. 40 pages. Grades 1–5.

Explains what paleontologists have been able to determine about how twelve different dinosaurs cared for their young. Good illustrations. Also, *Let's Go Dinosaur Tracking!* 1991. 48 pages. Grades 2–5.

Selsam, Milicent. *Strange Creatures That Really Lived*. New York: Scholastic, Inc., 1987. Grades 1–5.

Answers to interesting questions about unusual creatures that lived on Earth. Many illustrations.

Taylor, Paul D. *Fossil*. Eyewitness Books Series. New York: Alfred A. Knopf, 1990. 64 pages. Grades 5–7.

One of the best photographic sources. Also in this series: *Dinosaurs*.

Wexo, John Bonnett. *Dinosaurs*. Zoobooks Series. Mankato, Minn.: Creative Education, 1989. 24 pages. Grade 3.

Contains information on the types, behaviors, and fossil evidence of dinosaurs. Includes a "dinosaur quiz" and explanations of why they are extinct.

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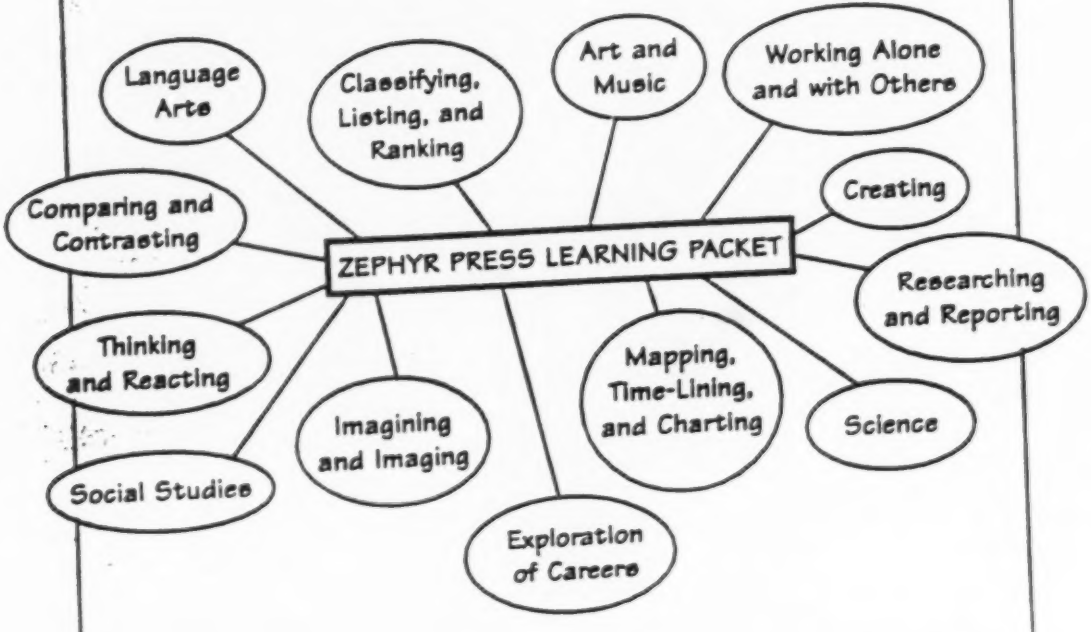

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